


What Is Claimed Is:

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1. A gas phase distributor in a fluid bed reactor or furnace comprising a gas phase piping array discharging into a fluid bed of granular solids through a plurality of tuyeres which are coupled to
5 and mounted beneath the piping array such that the granular solids are fluidized at a vertical elevation below the piping array thereby causing elevated temperature fluidizing gas to indirectly heat the fluidized bed through the piping array
10 prior to entering the fluidized bed through the tuyeres.
2. The gas phase distributor of claim 1, where the discharge from the piping array is through openings or ports in a bottom portion of the piping array.
3. The gas phase distributor of claim 2 comprising a heat exchanger in a feed line to the gas phase distributor such that the heat exchanger location is above a vertical elevation of
5 fluidizing gas distribution ports and submerged in the fluidized solids, thereby permitting indirect heat transfer from elevated temperature fluidizing gas so as to transfer energy to fluidized solids prior to entering the fluidized bed through the gas
10 distributor ports.
4. The gas phase distributor of claim 1, wherein gaseous fuel is combusted with air to achieve high temperature combustion gas products, which is fed through the piping array in the fluid bed furnace transferring energy through the piping array to the
5 fluid bed furnace thereby lowering the temperature

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of the gas discharging through the tuyeres into the fluidized bed.

5 5. The gas phase distributor of claim 3, wherein gaseous fuel is combusted with air to achieve high temperature combustion gas products, which is fed through the piping array in the fluid bed furnace transferring energy through the piping array to the fluid bed furnace thereby lowering the temperature of the gas discharging through the ports into the fluidized bed.

6. The gas phase distributor of claim 4, where the fuel is a liquid fuel.

7. The gas phase distributor of claim 5, where the fuel is a liquid fuel.

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5 8. The gas phase distributor of claim 1, wherein the discharge direction of the tuyeres initiates fluidization of the granular particles at an elevation below the distribution piping array to ensure the piping array is submerged in fluidized solids which provides for a high heat transfer coefficient from the piping array to the fluidizing solids, thereby reducing the temperature of the fluidizing gas prior to the discharging through the
10 tuyeres.

5 9. The gas phase distributor of claim 2, wherein the discharge direction of the openings initiates fluidization of the granular particles at an elevation below the distribution piping array to ensure the piping array is submerged in fluidized solids which provides for a high heat transfer coefficient from the piping array to the fluidizing solids, thereby reducing the temperature of the

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